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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,911	03/15/2001	Ronald A. Weimer	M4065.0434/P434	2915
24998	7590	12/16/2003	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			TOLEDO, FERNANDO L	
2101 L STREET NW			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20037-1526			2823	

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/805,911

Applicant(s)

WEIMER ET AL. 

Examiner

Fernando Toledo

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14, 17-33, 35-48 and 51-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17-33, 35-48 and 51-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 8, 11, 10, 13, 14, 17 – 24, 26, 27, 29 – 33, 35 – 43, 45, 46, 48, 49 and 51 – 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (U. S. patent 5,607,874) in view of Yamazaki et al. (U. S. patent 5,840,600).

In re claims 1, 21 and 40; Wang discloses in the U. S. patent 5,607,874; figures 1 – 9 and related text, forming several gate stacks over a substrate (10), each of the gate stacks include a gate oxide layer (11) and a conductive layer (16); forming spacers (20) on sidewalls of each of the several gate stacks; forming a source/drain region (12 and 8) in the substrate on opposite sides of the gate stack structure; forming a composite barrier layer over the source/drain regions (8 and 12), the composite barrier layer includes an oxide layer (22) and a barrier layer (24) over the oxide layer; forming a glass insulating layer (30) over the composite barrier layer; forming an opening (42) in the glass insulating layer and the composite barrier layer to expose at least a portion of the upper surfaces of the source/drain regions; and forming a conductor 48 in the opening.

Wang does not teach wherein the oxide layer is formed by oxidizing the upper surface of the source/drain region using atomic oxygen.

However, Yamazaki discloses forming an oxide layer by oxidizing the upper surface of the source/drain region using atomic oxygen (Column 12, Lines 14 – 27).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Wang and Yamazaki to enable forming the oxide layer 22 of Wang to be performed according to the teachings of Yamazaki because one of ordinary skill in the art would have been motivated to look at alternative suitable methods of performing the disclosed formation of layer 22 of Wang and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Wang in view of Yamazaki does not teach wherein the oxide layer is formed to a thickness of about 50 Å to about 100 Å.

However, thickness is a well known process variable and it would have been obvious to one of ordinary skill at the time the invention was made to form the oxide to a thickness of about 50 Å to about 100 Å, since determining the optimum or workable ranges requires routine experimentation by someone of ordinary skill in the art. Note that the specification contains no disclosure of either the critical nature of the claimed thicknesses or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen thicknesses or upon another variable recited in a claim, the Applicant must show that the chosen thicknesses are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

3. In re claim 2, Wang teaches further including the step of forming a glass layer in contact with the barrier layer (30) of the composite insulating structure.

4. In re claims 3, 37 and 54, Wang teaches wherein the glass layer is a doped glass film (column 5).

Art Unit: 2823

5. In re claims 4, 38 and 55, Wang teaches wherein the doped glass film includes BPSG material (column 5).
6. In re claims 5, 39 and 56, Wang teaches wherein the doped glass includes PSG material (column 5).
7. In re claims 6, 7, 22, 23, 41 and 42, Wang in view of Yamazaki does not teach wherein the oxide layer is grown at a temperature of about 300 – 900°C.
8. In re claims 8, 24 and 43, Wang in view of Mizuhara does not show wherein the oxide layer is grown for about 1 second to about 10 minutes.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to grow the oxide layer from about 1 second to about 10 minutes since time of oxidation is a very well-known process variable and determining the optimum or workable ranges requires only routine experimentation by someone of ordinary skill in the art. Note that the specification contains no disclosure of either the critical nature of the claimed time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen time or upon another variable recited in a claim, the Applicant must show that the chosen time range is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Wang in view of Yamazaki teaches wherein the oxygen is supplied by an ozone source (column 12).

9. In re claims 11, 27 and 46 Wang in view of Yamazaki teaches wherein the atomic oxygen is supplied by a plasma source (column 12).

Art Unit: 2823

10. In re claims 13, 29 and 48 Wang in view of Yamazaki teaches wherein the atomic oxygen is supplied by photoexcitation (column 12).

11. In re claims 14 and 30, Wang in view of Yamazaki teaches wherein the oxide layer is formed in a batch furnace system (column 12).

12. In re claims 17, 33 and 51 Wang teaches wherein the barrier layer is formed of an insulating material selected from the group consisting of silicon nitride, silicon oxide, silicon dioxide, silicon carbide and high temperature polymers (column 5).

13. In re claims 20 and 36, Wang teaches wherein the oxide layer and the barrier layer are further formed over the gate stack, the gate stack including several of spacers formed on sidewalls of the gate stack structure (figure 1).

14. Claims 9, 25 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Yamazaki as applied to claims 1 – 8, 11, 13 – 24, 27, 29 – 43, 46 and 48 – 56 above, and further in view of Lands et al. (U. S. patent 3,571,914).

Wang in view of Yamazaki does not disclose wherein the oxygen is supplied by in situ steam generation.

However, Lands in the U. S. patent 3,571,914; figures 1 – 4 and related text discloses as a well known process (i.e. a convenience process) to form an oxide layer by subjecting the device to steam by bubbling oxygen (column 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use steam as the source of oxygen in the invention of Wang in view of

Art Unit: 2823

Yamazaki since oxidizing with steam is a well-known process (i.e. a convenience process) as taught by Land.

15. Claims 12, 28 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view Yamazaki as applied to claims 1 – 8, 11, 13 – 24, 27, 29 – 43, 46 and 48 – 56 above, and further in view of Kirimura et al. (U. S. patent 6,383,896 B1).

Wang in view of Yamazaki does not show wherein the oxygen is supplied by a microwave source.

However, Kirimura in the U. S. patent 6,383,896 B1; figures 1 – 4 discloses that forming an oxide with plasma CVD or microwave CVD are art recognized equivalents (column 2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made wherein the atomic oxygen is supplied by a microwave source as taught by Kirimura in the invention of Wang in view of Yamazaki since Kirimura teaches that plasma and microwave CVD are art recognized equivalents.

### ***Response to Arguments***

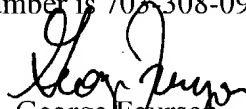
16. Applicant's arguments with respect to claims 1 – 14, 17 – 33, 35 – 48 and 51 – 56 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 703-305-0567 or 571-272-1867. The examiner can normally be reached on Mon-Fri 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

  
George Fourson  
Primary Examiner  
Art Unit 2823

  
FToledo